# Universal Window Times
## January 1980 thru December 1980

## HOW TO USE PUBLICATION NO. 229

The following Universal Window times are based on the specifications outlined in AS-49-12.  The European Universal Window is always during positive declination.  The start of the window is two hours from the setting moon time in Frankfurt, Germany.  The end of the window is when the moon sets at this same location.  Keep in mind that Western Europe can still see the moon for another hour, or so, after the moon sets at Frankfurt.  Also, the Western Hemisphere can still see the moon for many more hours.  Quite often the European and U.S. stations will operate during negative declinations, and just before moonset in Europe, if the times are convenient.  There is a good chance for activity on weekends on frequencies from 144.000 to 144.010 MHz.

Also included are the times each month for the new moon.  When the moon and sun are at almost the same G.H.A. and declination, the moon cannot be seen because of the visible radiation from the sun.  The radio frequency radiation will be sufficient to obliterate any echoes.  The more antenna directivity a station has, the closer to the sun it can be used.  There is a limit however.  With a 160 element collinear on 144 MHz, it is usually possible to operate successfully one day before and one day after new moon.

| 1980 | New Moon | Perigee | Apogee |
|---|---|---|---|
| January | 17 | 20 | 8 |
| February | 16 | 17 | 5 |
| March | 16 | 16 | 3,30 |
| April | 15 | 14 | 26 |
| May | 14 | 12 | 24 |
| June | 12 | 9 | 21 |
| July | 12 | 4,30 | 19 |
| August | 10 | 27 | 15 |
| September | 9 | 25 | 12 |
| October | 9 | 23 | 9 |
| November | 7 | 21 | 5 |
| December | 7 | 19 | 3,30 |

| JANUARY - 1980 | | FEBRUARY - 1980 | | MARCH - 1980 | |
|---|---|---|---|---|---|
| Day | UT | Day | UT | Day | UT |
| 1 | 0358-0558 | 1 | 0456-0656 | 1 | 0356-0556 |
| 2 | 0454-0654 | 2 | 0526-0726 | 2 | 0422-0622 |
| 3 | 0541-0751 | 3 | 0554-0754 | 3 | 0446-0646 |
| 4 | 0622-0822 | 4 | 0618-0818 | 17 | 1630-1830 |
| 5 | 0656-0856 | 5 | 0642-0842 | 18 | 1750-1950 |
| 6 | 0726-0926 | 19 | 1858-2058 | 19 | 1910-2110 |
| 7 | 0752-0952 | 20 | 2016-2216 | 20 | 2024-2224 |
| 8 | 0814-1014 | 21 | 2130-2330 | 21 | 2134-2334 |
| 9 | 0836-1036 | 22-23 | 2240-0040 | 22-23 | 2236-0036 |
| 22 | 2000-2200 | 23-24 | 2344-0144 | 23-24 | 2332-0132 |
| 23 | 2116-2316 | 25 | 0044-0244 | 25 | 0018-0218 |
| 24-25 | 2230-0030 | 26 | 0144-0344 | 26 | 0058-0258 |
| 25-26 | 2340-0140 | 27 | 0218-0418 | 27 | 0132-0332 |
| 27 | 0048-0248 | 28 | 0256-0456 | 28 | 0200-0400 |
| 28 | 0151-0351 | 29 | 0329-0529 | 29 | 0226-0426 |
| 29 | 0246-0446 | | | 30 | 0250-0450 |
| 30 | 0336-0536 | | | 31 | 0314-0514 |
| 31 | 0420-0620 | | | | |

| APRIL - 1980 | | MAY - 1980 | | JUNE - 1980 | |
|---|---|---|---|---|---|
| Day | UT | Day | UT | Day | UT |
| 14 | 1520-1720 | 11 | 1252-1452 | 8 | 1152-1352 |
| 15 | 1641-1841 | 12 | 1412-1612 | 9 | 1309-1509 |
| 16 | 1800-2000 | 13 | 1532-1732 | 10 | 1426-1626 |
| 17 | 1914-2114 | 14 | 1649-1849 | 11 | 1540-1740 |
| 18 | 2024-2224 | 15 | 1802-2002 | 12 | 1650-1850 |
| 19 | 2124-2324 | 16 | 1908-2108 | 13 | 1752-1952 |
| 20-21 | 2216-0016 | 17 | 2006-2206 | 14 | 1846-2046 |
| 21-22 | 2258-0058 | 18 | 2054-2254 | 15 | 1930-2130 |
| 22-23 | 2324-0134 | 19 | 2134-2334 | 16 | 2008-2208 |
| 24 | 0006-0206 | 20-21 | 2208-0008 | 17 | 2038-2238 |
| 25 | 0032-0232 | 21-22 | 2236-0036 | 18 | 2106-2306 |
| 26 | 0056-0256 | 22-23 | 2302-0102 | 19 | 2130-2330 |
| 27 | 0118-0318 | 23-24 | 2325-0125 | 20 | 2152-2352 |

| JULY - 1980 | |
|---|---|
| Day | UT |
| 5 | 0940-1140 |
| 6 | 1056-1256 |
| 7 | 1210-1410 |
| 8 | 1324-1524 |
| 9 | 1434-1634 |
| 10 | 1538-1738 |
| 11 | 1636-1836 |
| 12 | 1724-1924 |
| 13 | 1805-2005 |
| 14 | 1839-2039 |
| 15 | 1907-2107 |
| 16 | 1932-2132 |
| 17 | 1956-2156 |

| AUGUST - 1980 | |
|---|---|
| Day | UT |
| 1 | 0728-0928 |
| 2 | 0845-1045 |
| 3 | 1000-1200 |
| 4 | 1115-1315 |
| 5 | 1225-1425 |
| 6 | 1330-1530 |
| 7 | 1429-1629 |
| 8 | 1519-1719 |
| 9 | 1602-1802 |
| 10 | 1638-1838 |
| 11 | 1709-1909 |
| 12 | 1736-1936 |
| 13 | 1800-2000 |
| 14 | 1821-2021 |
| 29 | 0629-0829 |
| 30 | 0747-0947 |
| 31 | 0904-1104 |

| SEPTEMBER-1980 | |
|---|---|
| Day | UT |
| 1 | 1017-1217 |
| 2 | 1125-1325 |
| 3 | 1225-1425 |
| 4 | 1317-1517 |
| 5 | 1402-1602 |
| 6 | 1440-1640 |
| 7 | 1511-1711 |
| 8 | 1538-1738 |
| 9 | 1603-1803 |
| 10 | 1626-1826 |
| 25 | 0401-0601 |
| 26 | 0523-0723 |
| 27 | 0644-0844 |
| 28 | 0802-1002 |
| 29 | 0914-1114 |
| 30 | 1019-1219 |

| OCTOBER - 1980 | |
|---|---|
| Day | UT |
| 1 | 1116-1316 |
| 2 | 1204-1404 |
| 3 | 1242-1442 |
| 4 | 1315-1515 |
| 5 | 1344-1544 |
| 6 | 1408-1608 |
| 7 | 1430-1630 |
| 23 | 0251-0451 |
| 24 | 0414-0614 |
| 25 | 0536-0736 |
| 26 | 0653-0853 |
| 27 | 0804-1004 |
| 28 | 0908-1108 |
| 29 | 1000-1200 |
| 30 | 1044-1244 |
| 31 | 1119-1319 |

| NOVEMBER - 1980 | |
|---|---|
| Day | UT |
| 1 | 1149-1349 |
| 2 | 1214-1414 |
| 3 | 1238-1438 |
| 4 | 1259-1459 |
| 19 | 0022-0222 |
| 20 | 0142-0342 |
| 21 | 0304-0504 |
| 22 | 0424-0624 |
| 23 | 0540-0740 |
| 24 | 0650-0850 |
| 25 | 0749-0949 |
| 26 | 0840-1040 |
| 27 | 0919-1119 |
| 28 | 0951-1151 |
| 29 | 1019-1219 |
| 30 | 1044-1244 |

| DECEMBER - 1980 | |
|---|---|
| Day | UT |
| 1 | 1105-1305 |
| 16-17 | 2320-0120 |
| 18 | 0038-0238 |
| 19 | 0157-0357 |
| 20 | 0314-0514 |
| 21 | 0427-0627 |
| 22 | 0533-0733 |
| 23 | 0627-0827 |
| 24 | 0714-0914 |
| 25 | 0751-0951 |
| 26 | 0821-1021 |
| 27 | 0847-1047 |
| 28 | 0910-1110 |
| 29 | 0932-1132 |

# FIND THE MOON AND SUN USING PUBLICATION 229

## by Joe Reisert W1JR (ex-W1JAA; ex-W6FZJ)

Finding the moon and sun using "Tables of Computed Altitude and Azimuth - HO214" was described in AS49-1 (Ref. 1) and QST (Ref. 2). In some sections of the country this publication is no longer available. It is slowly being replaced by a new version called "Sight Reduction Tables for Marine Navigation, Publication Nr. 229" (ref. 3).

The differences between HO214 and Pub. 229 are subtle but both can be easily used to obtain accurate results. HO214 is easier to use when the declination is constant and multiple points are needed (such as plotting during a schedule). Pub. 229 is preferred when only one heading is needed since multiple bearings will require page changes.

The format of Pub. 229 is different from that of HO214. Each page starts with a different LHA (Local Hour Angle). Zero LHA is located on your meridian. For instance, Boston is approximately $71^O$ west longitude. Thus when the moon has a GHA of $71^O$ it is on the Boston local meridian and the LHA is zero. If the moon is to the east, the LHA is found by subtracting the GHA from your longitude. If the moon is to the west, subtract your longitude from the moon GHA. For example, if the GHA is $61^O$, your LHA is $10^O$. Likewise if the GHA is $81^O$ your LHA is still $10^O$. You must remember whether the moon is east or west of your longitude.

Now, how do we proceed? Let's use the examples in Ref. 1.

GHA $71^O$ Declination $N2^O$ [These moon data from the Nautical Almanac for year, month, day and time (GMT) in question].

Local coordinates 122°W. Longitude, 36° North Latitude.

Example #1:

1.  Subtract GHA from your longitude to find LHA (122 - 71 = 51°). Locate the page with 51°, 309° L.H.A. Latitude same name as Declination.

2.  Move down the declination column to 2° and then go across this line until you are below the column marked 36° (your latitude). The set of numbers in the Hc column is your local elevation and the set under the Z column is the local azimuth for the moon. In this case the values are 31°57.6' and 113.7° respectively.

Example #2:

If the GHA in example #1 had been 173° (vice 71°) your local hour angle would still have been 51° (173 - 122 = 51°) but west of your longitude. Therefore subtract the indicated azimuth from 360° to obtain the true value (360 - 113.7° = 246.3) or 246.3°. The elevation remains the same.

Example #3:

GHA 181° Declination S2° (from Nautical Almanac).

Local coordinates 122°W Longitude, 36° North Latitude.

1.  To find the LHA you must subtract your longitude from the GHA since the moon is west of your longitude. Therefore the LHA is 59 (181 - 122 = 59).

2.  Since the Declination is south (and you are in the northern hemisphere) turn to the page marked "Latitude Contrary Name to Declination LHA59°, 301°. Move down the declination column to 2° and across to the column headed 36°. Read the elevation as 23°19.4' and the azimuth as 111.1°. Since the moon is west you must subtract the azimuth from 360° to

obtain the correct azimuth of 248.9$^o$ (360 - 111.1 = 248.9).

Don't let the use of the HO214 or Pub. 229 frighten you.  It actually takes longer to read this write-up than it does to learn to use the tables.  Try a few practice examples to become more proficient.  After a few trials you'll see how easy it really can be.

Ref:

1.  "Use of Tables of Computed Altitude and Azimuth" by Joe Reisert, W6FZJ, Eimac Note AS49-1.

2.  "EME Scheduling, When and Where", by J. H. Reisert, W6FZJ, QST, July 1974 pp. 25 - 29.

3.  "Sight Reduction Tables for Marine Navigation".  Publication Nr. 229, Volume 3 covers latitudes 30 - 45$^o$ inclusive.  Other volumes are needed for different latitudes.  Price is $9.40 and it is available at many marine supply houses, government book stores or the U. S. Government Book Store, Room G-25, JFK Federal Bldg., Boston, Mass., 02203.

Brian Manns, K3VGX, has supplied the following additional address to obtain Publication 229.

    Defense Mapping Agency

    Office of Distribution Services

    Attn:  Code DDCP

    6101 McArthur Blvd.

    Washington, DC  20315

Ask for "Publication Nr. 229, Vol. 3, Sight Reduction Tables for Marine Navigation".  Volume 3 is for latitudes 30$^o$ through 45$^o$ inclusive.  Make the $9.40 check payable to the Treasurer of the United States.

# CALENDAR FOR THE YEAR 1980

## JANUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 |   |   |

## FEBRUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   |   | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 |   |

## MARCH

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 |   |   |   |   |   |

## APRIL

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 |   |   |   |

## MAY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

## JUNE

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 |   |   |   |   |   |

## JULY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 |   |   |

## AUGUST

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   |   | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 |   |   |   |   |   |   |

## SEPTEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 |   |   |   |   |

## OCTOBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 |   |

## NOVEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 |   |   |   |   |   |   |

## DECEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 |   |   |   |

| NEW MOON | ✕ |
| PERIGEE | ◯ |
| APOGEE | ☐ |
| UNIVERSAL WINDOW | — |